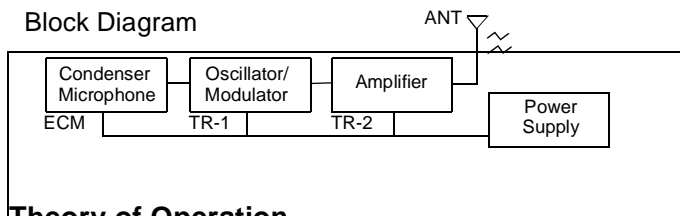


FM Wireless Microphone

INTRODUCTION

You are about to build a tiny FM wireless microphone, a complete FM "broadcasting station" hardly larger than your finger. Although it's small, it transmits to any FM radio up to 45 feet away. You can tune the microphone to any frequency between 91 and 97 MHz, to be sure there is no other station on the frequency you choose.

Block Diagram



Theory of Operation

Condenser Microphone — Picks up the sound.

Oscillator/Modulator — The circuit containing transistor TR1 is a Very High Frequency (VHF) oscillator, oscillating between 91 and 97 MHz. The oscillator frequency varies in proportion to the sound picked up by the microphone, which is applied to the base of TR1. This is known as frequency modulation (FM). The stronger the signal the microphone receives, the more the frequency varies.

Amplifier — Transistor TR2 amplifies the signal from the oscillator/modulator and delivers it to the antenna, where it is radiated through the air.

ASSEMBLY

In addition to the parts supplied, you also need one N battery; a battery holder for 1 N battery; a single-pole, single-throw toggle switch; a soldering iron; solder; diagonal cutters; and a plastic coil alignment tool. All are available at your local RadioShack store.

Mounting the Parts

Be sure you have all the parts, then mount and solder them to the printed circuit board (PCB). Refer to the illustrations and the PCB's markings. The transistors, microphone, and electrolytic capacitors are direction-sensitive, so be sure you mount them correctly. Use only as much heat and solder as you need to make good contact. Then, clip the leads close to the PCB.

Parts You'll Be Using

Description	Value/Item No.	Qty	Circuit No.
PCB	4030	1	
Capacitor	100 pF (marked 101)	1	C2
Capacitor	10 pF (marked 10)	1	C3
Capacitor	4 pF (marked 4)	1	C4
Capacitor	0.01 F (marked 103)	1	C5
Capacitor	4 pF (marked 4)	1	C6
Resistor	10 kOhm (Brown/Black/Orange/Gold)	1	R1
Resistor	1.2 kOhm (Brown/Red/Red/Gold)	1	R2
Resistor	33 kOhm (Orange/Orange/Orange/Gold)	1	R3
Resistor	100 Ohm (Brown/Black/Brown/Gold)	1	R4
Resistor	33 kOhm (Orange/Orange/Orange/Gold)	1	R5
Resistor	180 Ohm (Brown/Gray/Brown/Gold)	1	R6
Transistor	2SC1923 (marked C1923)	2	TR1, TR2
Electret Condenser Mic		1	ECM
Electrolytic Capacitor	10 F	1	C1
Electrolytic Capacitor	10 F	1	C7
Coil	0.27-0.30 H	1	L
Vinyl Insulated Wire		1	

Connecting the Components

1. Cut a 2-inch length from the supplied vinyl-insulated wire. Use the remainder as an antenna.
2. Use the battery holder's black wire to connect the battery holder's negative (–) terminal to the PCB's negative (–) terminal.
3. Use the battery holder's red wire to connect the battery holder's positive (+) terminal to one of the toggle switch's terminals.
4. Use the 2-inch wire you cut in Step 1 to connect the toggle switch's other terminal to the PCB's positive (+) terminal.
5. Check to be sure the parts are in correct position and polarity (+ to + and – to –), and all the soldering is good. Then install a fresh N battery into the battery holder.

Assembled Kit with Power Supply and Switch

OPERATION

1. Tune your FM radio to a frequency where no broadcast station is present.
2. Turn on the microphone.
3. Use a plastic coil alignment tool to adjust the microphone's frequency to the same frequency as your radio. Turn the coil clockwise to raise the frequency and counterclockwise to lower it. If the microphone is near the radio, you hear feedback when you are on the correct frequency.

Notes:

- If you use a metal screwdriver to adjust the coil, you might have to adjust it more than once, since the frequency changes as you move the screwdriver away from the microphone.
- Your body also affects the frequency. Try placing your hand close to the microphone (without touching it) to see how it affects the frequency.
- If the reception is poor, you might have tuned to a spurious frequency. Try adjusting the coil a bit more.

SCHEMATIC DIAGRAM

SPECIFICATIONS

Power Supply Voltage.....	DC 1.5 V
Current Consumption.....	7.4 mA
Battery Life (1 N Battery)	80 Hours
Transmitting Distance	45 Feet (Unobstructed)
Frequency Coverage	91–97 MHz
Dimensions (HWD)	1 ³ / ₈ x 9 ⁹ / ₁₆ x 1 ¹¹ / ₁₆ Inches

The experiments in this kit are designed to comply with FCC rules as long as you follow the instructions and use only the components and materials supplied with the kit.

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